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10/784,288	02/24/2004	Soichi Kuwahara	SON-2918	5053

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EXAMINER	
GOLDBERG, BRIAN J	

ART UNIT	PAPER NUMBER
2861	

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/784,288	KUWAHARA ET AL.	
	Examiner	Art Unit	
	Brian Goldberg	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 February 2004 and 25 August 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/31 8/25 12/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1-19 are objected to because of the following informalities:

2. Claim 1 recites the limitation "the main trajectories" in lines 10-11 of the claim. There is insufficient antecedent basis for this limitation in the claim.

3. Claims 2 and 4 recite the limitations "the trajectory" and "the droplet(s)" in lines 4-5 of the claim. There is insufficient antecedent basis for these limitations in the claims.

4. Claim 3 recites the limitation "the trajectory" in lines 4-5 of the claim. There is insufficient antecedent basis for this limitation in the claim. Also, "trajectory of droplet" in line 5 of the claim should be "trajectory of droplet***s***".

5. Claims 5, 7, and 9 recite the limitation "the same pixel area" in line 10 or the last line of the claim. There is insufficient antecedent basis for this limitation in the claims.

6. Claims 8, 9, 10, and 11 recite the limitation "the number of pixels" in lines 3-4 of the claim. There is insufficient antecedent basis for this limitation in the claims.

7. Claim 11 recites the limitation "the same pixel area" in the last line of the second paragraph of the claim. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 13 recites the limitation "the bubble generation unit" in the last line of the first paragraph of the claim. There is insufficient antecedent basis for this limitation in the claim.

9. Claim 16 recites the limitations "the main control", "the discharge of droplets", "the secondary control", "the trajectory", and "the secondary controlling unit" in lines 4,

5, 6, 8, and 10 of the claim, respectively. There is insufficient antecedent basis for these limitations in the claim.

10. Claims 17-19 recite the limitation "the trajectory" in line 4 of the claim. There is insufficient antecedent basis for this limitation in the claims.

11. Claims 18 and 19 recite the limitation "the discharge angle" in the second to last line of the claim. There is insufficient antecedent basis for this limitation in the claim. Also, in claim 19, "is selected" in line 7 of the claim should be deleted.

12. Appropriate correction is required.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. Claims 1-12, 14, and 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamada et al. (US 20020021324).

15. Regarding claim 1, Yamada et al. disclose "a liquid discharge apparatus (10 of Fig 1) having a head (200 of Fig 1) with a plurality of liquid dischargers including nozzles (230 of Fig 2) aligned in parallel in a row, comprising: a main controlling unit (500 of Fig 1) formed on each liquid discharger, the main controlling unit controlling the discharge of droplets from the nozzles; a secondary controlling unit (400, 600 of Fig 1) formed on each liquid discharger, the secondary controlling unit controlling the

discharge of a droplet so that the droplet is discharged along at least one secondary trajectory different from the main trajectories of the droplets discharged by the liquid dischargers controlled by the main controlling unit (see Par [0051] and [0057] and Fig 7); and a secondary-control executing unit for individually setting whether or not the secondary controlling unit for each liquid discharger is operated (610, 620 of Fig 1)."

16. Regarding claim 2, Yamada et al. disclose "a liquid discharge apparatus (10 of Fig 1) having a head (200 of Fig 1) with a plurality of liquid dischargers including nozzles (230 of Fig 2) aligned in parallel in a row, comprising: a discharge-direction changing unit (632, 640 of Fig 1) for changing the trajectory of the droplets discharged from the nozzle of each liquid discharger in at least two different directions in the row (see Fig 7, Par [0077] and [0078]); and a reference-direction setting unit for selecting one of the trajectories of the droplets discharged from liquid dischargers controlled by the discharge-direction changing unit as a reference direction (420 of Fig 1)."

17. Regarding claim 3, Yamada et al. disclose "a liquid discharge apparatus (10 of Fig 1) having a head (200 of Fig 1) with a plurality of liquid dischargers including nozzles (230 of Fig 2) aligned parallel row, comprising: a discharge-direction changing unit (632, 640 of Fig 1) for changing the trajectory of droplet discharged from the nozzle of each liquid discharger in at least two different directions in the row (see Fig 7, Par [0077] and [0078]); and a discharge-angle setting unit (621 of Fig 1) for selecting discharge angles for each droplet discharged from liquid dischargers controlled by the discharge-direction changing unit for each liquid discharger (431, 432, 631, 632 of Fig 1)."

18. Regarding claim 4, Yamada et al. disclose "a liquid discharge apparatus (10 of Fig 1) having a head (200 of Fig 1) with a plurality of liquid dischargers including nozzles (230 of Fig 2) aligned parallel row, comprising: a discharge-direction changing unit (632, 640 of Fig 1) for changing the trajectory of the droplet discharged from the nozzle of each liquid discharger in at least two different directions in the row (see Fig 7, Par [0077] and [0078]); a discharge-angle setting unit (621 of Fig 1) for setting discharge angles for each droplet discharged from liquid dischargers controlled by the discharge-direction changing unit for each liquid discharger (431, 432, 631, 632 of Fig 1); and a reference-direction setting unit for selecting one of the trajectories of the droplets discharged from liquid dischargers controlled by the discharge-direction changing unit as a reference direction (420 of Fig 1)."

19. Regarding claim 5, Yamada et al. disclose "a discharge controlling unit (620, 630, 640 of Fig 1) for controlling the discharge of ink droplets by the discharge-direction changing unit (632, 640 of Fig 1) so that a pixel row or a pixel is formed by discharging droplets from at least two neighboring liquid dischargers, wherein droplets are discharged along different trajectories from at least two neighboring liquid dischargers to form a pixel row by landing on the same pixel row or to form a pixel by landing on the same pixel area (see Par [0062], [0064], [0065])."

20. Regarding claim 6, Yamada et al. disclose "a discharge controlling unit (620, 630, 640 of Fig 1) for controlling the discharge of a droplet by the discharge-direction changing unit (632, 640 of Fig 1) so that the droplet lands in a landing position in a pixel area, wherein the landing position is one of M (where M is an integer greater or equal to

two) different landing positions aligned in a predetermined direction in the pixel area and at least a part of each of the M landing positions is included in the pixel area (see Par [0062], [0064], [0065], [0071])."

21. Regarding claim 7, Yamada et al. disclose "a first discharge controlling unit (620, 630, 640 of Fig 1) for controlling the discharge of ink droplets by the discharge-direction changing unit (632, 640 of Fig 1) so that a pixel row or a pixel is formed by discharging droplets from at least two neighboring liquid dischargers, wherein droplets are discharged along different trajectories from at least two neighboring liquid dischargers to form a pixel row by landing on the same pixel row or to form a pixel by landing on the same pixel area (see Par [0062], [0064], [0065]); and a second discharge controlling unit for controlling the discharge of a droplet by the discharge-direction changing unit so that the droplet lands in a landing position in a pixel area, wherein the landing position is one of M (where M is an integer greater or equal to two) different landing positions aligned in a predetermined direction in the pixel area and at least a part of each of the M landing positions is included in the pixel area (see Par [0062], [0064], [0065], [0071])."

22. Regarding claim 8, Yamada et al. disclose "a resolution increasing unit for increasing the number of pixels by controlling the droplets discharged from each liquid discharger so that the droplets land in at least two different positions in a predetermined direction whereby the number of pixels is increased in comparison with the number of pixels formed by droplets discharged from each liquid discharger landing in one position (see Par [0062], [0064], [0065], [0071])."

23. Regarding claim 9, Yamada et al. disclose "a resolution increasing unit for increasing the number of pixels by controlling the droplets discharged from each liquid discharger so that the droplets land in at least two different positions in a predetermined direction whereby the number of pixels is increased in comparison with the number of pixels formed by droplets discharged from each liquid discharger landing in one position (see Par [0062], [0064], [0065], [0071]), and a discharge controlling unit (620, 630, 640 of Fig 1) for controlling the discharge of ink droplets by the discharge-direction changing unit so that a pixel row or a pixel is formed by discharging droplets from at least two neighboring liquid dischargers, wherein droplets are discharged along different trajectories from at least two neighboring liquid dischargers to form a pixel row by landing on the same pixel row or to form a pixel by landing on the same pixel area (see Par [0062], [0064], [0065])."

24. Regarding claim 10, Yamada et al. disclose "a resolution increasing unit for increasing the number of pixels by controlling the droplets discharged from each liquid discharger so that the droplets land in at least two different positions in a predetermined direction whereby the number of pixels is increased in comparison with the number of pixels formed by droplets discharged from each liquid discharger landing in one position (see Par [0062], [0064], [0065], [0071]); and a discharge controlling unit for controlling the discharge of a droplet by the discharge-direction changing unit so that the droplet lands in a landing position in a pixel area, wherein the landing position is one of M (where M is an integer greater or equal to two) different landing positions aligned in a

predetermined direction in the pixel area and at least a part of each of the M landing positions is included in the pixel area (see Par [0062], [0064], [0065], [0071])."

25. Regarding claim 11, Yamada et al. disclose "a resolution increasing unit for increasing the number of pixels by controlling the droplets discharged from each liquid discharger so that the droplets land in at least two different positions in a predetermined direction whereby the number of pixels is increased in comparison with the number of pixels formed by droplets discharged from each liquid discharger landing in one position (see Par [0062], [0064], [0065], [0071]); a first discharge controlling unit (620, 630, 640 of Fig 1) for controlling the discharge of ink droplets by the discharge-direction changing unit (632, 640 of Fig 1) so that a pixel row or a pixel is formed by discharging droplets from at least two neighboring liquid dischargers, wherein droplets are discharged along different trajectories from at least two neighboring liquid dischargers to form a pixel row by landing on the same pixel row or to form a pixel by landing on the same pixel area (see Par [0062], [0064], [0065]); and a second discharge controlling unit for controlling the discharge of a droplet by the discharge-direction changing unit (632, 640 of Fig 1) so that the droplet lands in a landing position in a pixel area, wherein the landing position is one of M (where M is an integer greater or equal to two) different landing positions aligned in a predetermined direction in the pixel area and at least a part of each of the M landing positions is included in the pixel area (see Par [0062], [0064], [0065], [0071])."

26. Regarding claim 12, Yamada et al. disclose "a liquid chamber (232 of Fig 2) containing the liquid, bubble generation units (235, 310, 320 of Fig 2) disposed inside

the liquid chamber for generating bubbles in the liquid contained in the liquid chamber by supplying energy, and a nozzle member provided with nozzles (230 of Fig 2) for discharging the liquid contained in the liquid chamber in response to generation of bubbles by the bubble generation unit, wherein a secondary controlling unit (400, 600 of Fig 1) controls the main trajectory of a droplet discharged by supplying energy having a second value the bubble generation units, second value differs from first value of the energy supplied to the bubble generation units by the main controlling unit, so that the secondary trajectory of the droplet differs from the main trajectory of the droplet controlled by the main controlling unit (see Par [0051] and [0057] and Fig 7)."

27. Regarding claim 14, Yamada et al. disclose "a liquid chamber (232 of Fig 2) containing the liquid, bubble generation units (235, 310, 320 of Fig 2) disposed inside the liquid chamber for generating a bubble in the liquid contained in the liquid chamber by supplying energy, and a nozzle member provided with nozzles (230 of Fig 2) for discharging the liquid contained in the liquid chamber as a bubble is generated by the bubble generation unit, wherein the discharge-direction changing unit (632, 640 of Fig 1) comprises a main controlling unit (500 of Fig 1) for controlling the discharge of droplets from nozzles by supplying energy to the bubble generation unit and a secondary controlling unit (400, 600 of Fig 1) for controlling the trajectory of a droplet discharged by supplying energy having a second value to the bubble generation units, the second value differs from a first value of the energy supplied to the bubble generation units by the main controlling unit, so that the trajectory of the droplet differs

from the trajectory of the droplet controlled by the main controlling unit (see Par [0051] and [0057] and Fig 7)."

28. Regarding claim 16, Yamada et al. disclose "performing the main control (500 of Fig 1) of the discharge of droplets from the nozzles (230 of Fig 2) of each liquid discharger; performing the secondary control (400, 600 of Fig 1) of the discharge of droplets from each liquid discharger along at least one trajectory different from the trajectory of the main control in a row (see Par [0051] and [0057] and Fig 7); and determining whether or not the secondary controlling unit is operated is determined for each liquid discharger (610, 620 of Fig 1)."

29. Regarding claim 17, Yamada et al. disclose "selecting the trajectory of droplets discharged from the nozzles of each liquid discharger from at least two different trajectories in a predetermined direction (see Fig 7, Par [0077] and [0078]); and selecting one of the trajectories as a reference trajectory (420 of Fig 1)."

30. Regarding claim 18, Yamada et al. disclose "selecting the trajectory of droplets discharged from the nozzles of each liquid discharger from at least two different trajectories in a predetermined direction (see Fig 7, Par [0077] and [0078]); and setting the discharge angle (621 of Fig 1) of the droplets independently for each liquid discharger (431, 432, 631, 632 of Fig 1)."

31. Regarding claim 19, Yamada et al. disclose "selecting the trajectory of droplets discharged from the nozzles of each liquid discharger from at least two different trajectories in a predetermined direction (see Fig 7, Par [0077] and [0078]); selecting one of the trajectories as a reference trajectory (420 of Fig 1); and setting the discharge

angle (621 of Fig 1) of the droplets independently for each liquid discharger (431, 432, 631, 632 of Fig 1)."

Claim Rejections - 35 USC § 103

32. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

33. Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. in view of Ishinaga et al. (US 5754201).

34. Regarding claim 13, Yamada et al. disclose "a liquid chamber (232 of Fig 2) containing the liquid...and a nozzle member provided with nozzles (230 of Fig 2) for discharging the liquid contained in the liquid chamber as a bubble is generated by the bubble generation unit...and the secondary controlling unit (400, 600 of Fig 1) ...controls the main trajectory of a droplet...so that the secondary trajectory differs from the main trajectory controlled by the main controlling unit (500 of Fig 1, see Par [0051] and [0057] and Fig 7)." Thus Yamada et al. meet the claimed invention except providing "heating elements...wherein a plurality of heating elements is aligned in parallel in a row...a circuit with a switching element connected to the serial connection between the heating elements...supplying an electrical current via the circuit to the connection between the heating elements or by supplying an electrical current from the

connection to the heating elements to control the electrical current supplied to the heating elements."

35. Ishinaga et al. teach providing "heating elements (4 and 6 of Fig 5a-d)...wherein a plurality of heating elements is aligned in parallel in a row (see Fig 7)...a circuit with a switching element connected to the serial connection between the heating elements (col 5 ln 6-11)...supplying an electrical current via the circuit to the connection between the heating elements or by supplying an electrical current from the connection to the heating elements to control the electrical current supplied to the heating elements (see col 5 ln 6-11 and Fig 5a-d)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to provide the heating elements as outlined above. One would have been motivated to so modify Yamada et al. for the benefit of producing different sized ink drops.

36. Regarding claim 15, Yamada et al. disclose "a liquid chamber (232 of Fig 2) containing the liquid...and a nozzle member provided with nozzles (230 of Fig 2) for discharging the liquid contained in the liquid chamber as a bubble is generated by the bubble generation unit...and the discharge-direction changing unit (632, 640 of Fig 1)...at least two different trajectories can be selected in a predetermined direction (see Par [0051] and [0057] and Fig 7)." Thus Yamada et al. meet the claimed invention except "heating elements...wherein a plurality of heating elements is aligned in parallel in a row...a circuit with a switching element connected to the serial connection between the heating elements...controlling the electrical current supplied to the heating elements by supplying an electrical current via the circuit to the connection between the heating

elements or by receiving an electrical current from the connection between the heating elements."

37. Ishinaga et al. teach providing "heating elements (4 and 6 of Fig 5a-d)...wherein a plurality of heating elements is aligned in parallel in a row (see Fig 7)...a circuit with a switching element connected to the serial connection between the heating elements (col 5 ln 6-11)... controlling the electrical current supplied to the heating elements by supplying an electrical current via the circuit to the connection between the heating elements or by receiving an electrical current from the connection between the heating elements (see col 5 ln 6-11 and Fig 5a-d)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to provide the heating elements as outlined above. One would have been motivated to so modify Yamada et al. for the benefit of producing different sized ink drops.

Conclusion

38. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Logan et al. (US 4,575,730) teaches discharge direction varying means controls the discharge direction of a liquid droplet discharged from the nozzle by controlling the difference in energy (column 5, lines 65-68-column 6, lines 1-10, also see Fig 5 and Fig 7).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Goldberg whose telephone number is 571-272-2728. The examiner can normally be reached on Monday through Friday, 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Talbott can be reached on 571-272-1934. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BJG

January 5, 2006

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